(b) (5)

Xcel Energy™

James D. Albright
Assistant General Counsel

1225 17th Street, Suite 900
Denver, Colorado 80202-5533
Phone: 303.294.2753
Fax: 303.294.2988

September 19, 2005

VIA FEDERAL EXPRESS

U.S. Environmental Protection Agency, Region 8
999 18th Street, Suite 300
Denver, CO 80202-2466
Attention: Joshua Rickard (8ENF-AT)

Re: Response to Clean Air Act Request for Information – Xcel Energy Leyden Natural Gas Storage Facility

Dear Mr. Rickard:

Enclosed is the response of Public Service Company of Colorado ("PSCo") to the August 17, 2005 Request for Information (the "Request") from the United States Environmental Protection Agency ("EPA") concerning the Leyden Natural Gas Storage Facility ("Facility") in Jefferson County, Colorado.

As an initial matter, it is important to point out that the questions raised in the Request were explored in-depth before the Colorado Oil and Gas Conservation Commission ("COGCC") during two full days of hearings regarding the closure of the Facility, in which the COGCC considered the expert reports and sworn testimonies of five scientific experts. The Colorado General Assembly has vested the COGCC with the "exclusive authority to regulate the public health, safety, and welfare aspects, including protection of the environment, of the termination of operations and permanent closure" of underground natural gas storage caverns. *See* § 34-60-106(17)(a), C.R.S. In September 2003, the COGCC unanimously approved PSCo's plan for closure of the Facility, expressly finding that the plan protects public health and the environment.

In addition, EPA has approved Colorado's air program, pursuant to which the Colorado Department of Public Health and Environment ("CDPHE") has primary jurisdiction to implement and enforce the Clean Air Act ("CAA") in the State. The CDPHE has determined that venting of natural gas at the Facility does not exceed regulatory levels. Indeed, the constituents in the natural gas are well below emission standards for volatile organic compounds and hazardous air pollutants. Moreover, the natural gas stored at the Leyden Facility is not an extremely hazardous substance subject to regulation under Section 112(r) of the CAA.

The COGCC and the CDPHE have acted to ensure that the closure of the Facility is protective of human health and the environment and complies with the CAA. Given the extensive involvement of these State agencies, there simply is no basis for EPA's Request.

Nonetheless, PSCo has acted in good faith to provide a detailed response to the Request. This response is based upon a review of PSCo's records, and includes all non-privileged information in PSCo's custody and control that relate to EPA's Request. This response is based upon information and belief, and, except where otherwise noted, is complete given the information known to date. To the extent PSCo discovers any new information, it specifically reserves the right to supplement or amend these answers. This response does not constitute an admission by PSCo of liability with respect to the Facility, the conditions on or surrounding the Facility, or any acts or omissions by any person concerning the Facility.

If you have any questions regarding the enclosed response, please contact me or Bill Uding at 303-571-7383.

Very truly yours,

James D. Albright
Assistant General Counsel

Attachments
Enclosures

cc (without enclosures):

Ken Fellman, Mayor
City of Arvada
P.O. Box 8101
8101 Ralston Road
Arvada, CO 80001-8101

Craig Kocian, City Manager
City of Arvada
P.O. Box 8101
8101 Ralston Road
Arvada, CO 80001-8101

cc (without enclosures) (continued):

Brian J. Macke, Director
Colorado Oil and Gas Conservation Commission
1120 Lincoln Ave., Suite 801
Denver, CO 80203

Margie Perkins
Colorado Department of Public Health and Environment
Air Quality Division
4300 Cherry Creek Dr-S
Denver, CO 80246

RESPONSES OF PUBLIC SERVICE COMPANY OF COLORADO TO USEPA'S CLEAN AIR ACT REQUEST FOR INFORMATION DATED AUGUST 17, 2005 REGARDING THE LEYDEN NATURAL GAS STORAGE FACILITY IN JEFFERSON COUNTY, COLORADO

1. Describe the amount of gas that has been lost, stored and unaccounted for from the Leyden caverns. For each of these categories, provide supporting calculations, documentation or justification indicating how the amounts were determined.

Response: As a point of clarification, the storage of gas at the Leyden Gas Storage Facility occurred in the Lower Laramie formation, which includes the former coal mine caverns, as well as sandstones and other permeable rock within this formation. Prior to the Company's use of the former coal mine for gas storage, the roofs of the mine caverns collapsed, creating "rubble zones" within the Lower Laramie formation in which gas could be safely and efficiently stored.

The volume of gas "lost" at Leyden is 574,012 Mcf. (Please note that one Mcf equals one thousand standard cubic feet at 14.73 p.s.i.a.) This represents the volume of gas currently remaining in the Leyden Gas Storage Facility that will not be recovered. This amount is supported by the monthly Summary of Gas Delivered Statements; copies of the available Summary of Gas Delivered Statements are enclosed herewith. This volume of unrecovered gas remaining in the Leyden Facility is also consistent with the June 16, 2003 Report of Dave O. Cox of Questa Engineering Corporation, and Mr. Cox's testimony in support thereof during the hearings held on Public Service's Closure Plan before the Colorado Oil and Gas Conservation Commission ("COGCC") on August 18 and 19, 2003. A copy of Mr. Cox's report, along with a complete transcript of the COGCC hearings is enclosed.

The total volume of gas "stored" in the Leyden Facility was 90,009,966 Mcf, or approximately 90 billion cubic feet (Bcf). This represents the cumulative total volume of gas injected into and stored in the Facility during its 45-year operating history. This volume is supported by the enclosed monthly activity reports referenced above.

The volume of gas "unaccounted for" during the operation of the Leyden Facility is reported as 2,869,178 Mcf. This represents the total volume recorded by the Company to reflect gas used in operations at the Leyden Facility and otherwise to make total system volumes (i.e., all inlet and outlet points) balance to zero. This volume is supported, in part, by annual calculations ("Lost and Unaccounted for Gas Calculations") that were performed to reflect a combination of metering inaccuracies, fuel used for compression, field use, fuels for heating equipment, pipe cleaning or pigging operations, and various incidental losses from surface equipment. Copies of the available annual Lost and Unaccounted for Gas Calculations are enclosed

herewith. The significance and derivation of this volume was discussed by Mr. Uding in his testimony during the COGCC hearings. See enclosed transcripts.

2. Provide a list of all points where emissions have been vented and left the cavern, such as wells, mine shafts and gas migration, and how much gas has been released to the atmosphere through these points. Include information on sources that in the past may have emitted gas and procedures that were taken to prevent any further gas release or any other reasons that gas may no longer be expected to vent from these areas. Include any gas analysis available for these locations.

Response: Please see note in response to Request No. 1 regarding the location of the underground storage of gas. Every known incident of storage gas released to the atmosphere from the Leyden Gas Storage Facility was from a man-made penetrations to the storage formation. These releases can be categorized as unintentional or planned, and will be discussed in order below. The sources of these releases were also discussed in the June 16, 2003 Report of Dave O. Cox of Questa Engineering Corporation, and in Mr. Cox's testimony during the hearings held on Public Service's Closure Plan before the COGCC on August 18 and 19, 2003. Copies of both Mr. Cox's expert report and the complete transcript of the hearings are enclosed.

A. Unintentional Releases

In 1964, a leak to the surface was discovered in Barbara Gulch as gas bubbles under ice. This leak was found to be an abandoned, but unplugged, deep water well. A drill rig was used to clean the well bore to bottom and set new cemented casing. This well became Observation Well #17b that was used for the rest of the life of the Facility. No further gas was observed or released from this location. This well was plugged and abandoned as a part of the closure in 2005.

In 1979, a leak to the surface was discovered in Section 26 during a walking leak survey that was a part of normal operations. This leak was found to be a coal exploration core hole drilled ahead of mining. A drill rig was used to clean this hole to bottom and new cemented casing was installed. This well became Observation Well #23 and was used for the rest of the life of the facility. No further gas was released from this location. This well was plugged and abandoned as a part of the closure in 2005.

During the operation of the storage field, gas was detected at the surface of the #2 shaft seal. This occurred in the late 1970s. The pumping of water from the cavern area around the #2 shaft seal was halted, allowing this cavern area to flood and cut off gas to the shaft seal. No further gas was detected at this location. This well was plugged and abandoned as a part of the closure in 2005.

B. Planned Releases

Well #31. This observation well was drilled in 1993 outside of the mined cavern area. A small accumulation of storage gas was encountered in a Lower Laramie sandstone above the stratum containing the coals. The Staff of the COGCC suggested that, after several years of pressure observation, the gas be vented. The well was vented to atmosphere and the volumes and rates were measured. Venting began in October 1999 and continued until October 2004, when the gas was depleted. The total volume vented during this period was 92 Mcf.

Well #36. This observation well was drilled in 1999. Storage gas was found in a Lower Laramie sandstone and was observed to be in direct communication with the caverns. During the gas recovery operations of the Facility closure, the pressure observed in Well #36 declined with the field pressure until water in the caverns apparently cut off the connection. This well was then vented to deplete the remaining gas in this sandstone. The volume vented from April 2004 to July 2005, when production ceased, was 228 Mcf.

Well #7. This water well was drilled in 1960 as a water production well to dewater the east mine cavern. Water production was halted permanently in the late 1970s to remedy the surface gas occurrence in the #2 shaft seal. The well was worked over as a part of the closure process to be used as an observation well and, later, as a water injection well. Following this work over, small volumes of storage gas were found in the well. The well was connected to gathering lines and produced. When the pressures became too low to flow into the gathering lines, the gas was vented to atmosphere. The vent was started in July 2004 and ceased in August 2004, when the gas depleted. The total volume vented was 13 Mcf.

Well #5. This well was operated as a gas injection and withdrawal well during the operational life of the Leyden Facility. Being the stratigraphic high well in the storage system, gas was produced from this well during the cavern-flooding phase of the closure operations. As the water encroached on the well, the flow rate and gas pressure fell below what could reasonably be gathered in the piping systems for recovery back to the Leyden station. The well was then put on vent to atmosphere. The venting began in October 2004 and ended in May 2005. The total gas volume vented during this period was 84 Mcf.

Consolidated Mutual Water Co., Permit No. 60395-F. This well was drilled by the Consolidated Mutual Water Company in the Spring of 2004 in Section 23 off the northeast edge of the Leyden Facility property. Storage gas was discovered during a water production test following completion. The wellhead equipment was rebuilt to accommodate the presence of gas and a short production test was started. Gas was available at high rates when the water was pumped. The well was shut in and is

awaiting flaring equipment prior to continuing testing or production. The volume vented during the October 2004 test was 1683 Mcf.

3. Provide information on Xcel's activities to inform the public regarding the one-mile buffer area around Leyden designated the "Protection Zone." This includes information to inform home owners, drillers and other persons that may be affected by this zone.

Response: Pursuant to the COGCC's approved modifications to the Company's Closure Plan, the following procedures have been put into place. COGCC Staff has formally requested that the Colorado Office of the State Engineer notify the COGCC Staff of any applications for water well permits for wells proposed to be drilled within a one mile radius of the Leyden Facility property. From August 2003 through June 2004, a one-half mile radius criterion was employed. Upon receipt of a notice, the COGCC Staff notifies the Company and issues a letter to the well operator recommending the use of blowout prevention equipment while drilling a water well. Company personnel also contact the well operator and advise of the possibility of encountering natural gas in the drilling operations and offer to reimburse the drilling operator for any costs associated with the use of blowout prevention equipment or other costs incurred in anticipation of encountering natural gas.

Since this procedure was put into place in August 2003, only one well permit was applied for that triggered the notification procedures outlined above. This permit was for the Consolidated Mutual Water Well, Permit No. 60395-F, located approximately 1700 feet from the Leyden Facility property. Company personnel reviewed recommended safety procedures with a representative of the engineering company supervising the well drilling operations. It was after the discovery of gas in April 2004 at this location that the COGCC Staff and the Company agreed to expand the radius for this notification zone from one-half mile to one mile.

4. Are there any programs to monitor for natural gas around the area? This includes programs that may be in place to monitor for natural gas in homes. Provide information on these programs. Has any of this monitoring been done in locations near the inferred subsurface fracture defined in the seismic line GR-5?

Response: An extensive soil gas monitoring program is in place in the area on and around the Leyden Facility. The program was started in February 2000 and continues today, collecting soil gas samples from a network of approximately 80 shallow monitoring wells on a quarterly basis. The samples are analyzed for hydrocarbons and a report is generated and submitted to the COGCC. Additionally, an electronic database was developed to track and view the data. A copy of that database is provided on the enclosed CD-ROM. A copy of the original report from this program is also enclosed. This report details the soil gas monitoring well network and analysis

method. The program was expanded following the COGCC hearings on the Leyden Closure Plan. The database also includes data collected from an adjacent monitoring effort conducted by the contractor for the Spring Mesa Subdivision housing development. The Spring Mesa Subdivision property is wholly located in Section 35, south of the Leyden Facility. The data points from this program are identified with a SM prefix in the database.

There are no Company-sponsored programs in place that monitor for natural gas inside of homes in this area.

The existing soil gas-monitoring network includes 4 monitoring wells along the trace of the GR-5 seismic line. These wells are identified as SVW-39, SVW-40, SVW-41 and SVW-42. These sites were put into service in February 2004 and are expected to be active for the remainder of the program.

5. Provide information about any current and future plans and programs to monitor shallow soil gas in and around the Leyden facility. Also, describe the results and conclusions of any past monitoring programs and supporting data.

Response: See response to Request No. 4.

6. Provide information about any current and future plans and programs to monitor subsurface soil gas in and around the Leyden facility. Also, describe the results and conclusions of any past monitoring programs and supporting data.

Response: See response to Request No. 4.

7. Who is the current owner and/or operator of the injection wells at the Leyden facility?

Response: Public Service Company of Colorado currently owns and operates the eight remaining wells at the Leyden Facility, as follows: Injection Well #8; Water Withdrawal Wells: Well #7, Well #12, Well #21; Observation Wells: Well #33, Well #34, Well #35 and Well #36).

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
999 18TH STREET- SUITE 300
DENVER, CO 80202-2466
Phone 800-227-8917
http://www.epa.gov/region08

Ref: ENF-AT

AUG 17 2005

Registered Agent:
Corporation Service Company
1560 Broadway
Denver, CO 80202

Re: Clean Air Act Request for Information Regarding Xcel Energy, Inc. Leyden Natural Gas Storage Facility in Jefferson County, Colorado

To Whom It May Concern:

The United States Environmental Protection Agency (EPA) hereby requires Public Service Company (Xcel) to provide certain information to assist in determining the Clean Air Act ("the Act") compliance status of the Leyden Natural Gas Storage Facility located in or near Arvada, Colorado.

Pursuant to Section 114(a) of the Act, 42 U.S.C. § 7414(a), the Administrator of EPA is authorized to require any person who the Administrator believes may have needed information to establish and maintain records, make reports and provide such other information as he may reasonably require pursuant to any provision of the Act. Therefore, you are hereby required to respond to the following questions and requests for information within the time period specified:

1. Describe the amount of gas that has been lost, stored and unaccounted for from the Leyden caverns. For each of these categories, provide supporting calculations, documentation or justification indicating how the amounts were determined.

2. Provide a list of all points where emissions have been vented and left the cavern, such as wells, mine shafts and gas migration, and how much gas has been released to the atmosphere through these points. Include information on sources that in the past may have emitted gas and procedures that were taken to prevent any further gas release or any other reasons that gas may no longer be expected to vent from these areas. Include any gas analysis available for these locations.

3. Provide information on Xcel's activities to inform the public regarding the one-mile buffer area around Leyden designated the "Protection Zone." This includes

information to inform home owners, drillers and any other person that may be affected by this zone.

4. Are there any programs to monitor for natural gas around the area? This includes programs that may be in place to monitor for natural gas in homes. Provide information on these programs. Has any of this monitoring been done in locations near the inferred subsurface fracture defined in the seismic line GR-5?

5. Provide information about any current and future plans and programs to monitor shallow soil gas in and around the Leyden facility. Also, describe the results and conclusions of any past monitoring programs and supporting data.

6. Provide information about any current and future plans and programs to monitor subsurface soil gas in and around the Leyden facility. Also, describe the results and conclusions of any past monitoring programs and supporting data.

7. Who is the current owner and/or operator of the injection wells at the Leyden facility?

You must submit the response to the above items within thirty (30) calendar days after your receipt of this letter. This information should be submitted to:

U.S. Environmental Protection Agency, Region 8
999 18th Street, Suite 300
Denver, CO 80202-2466
Attention: Joshua Rickard (8ENF-AT)

If you anticipate being unable to respond fully to this request within the time period specified, you must submit a sworn declaration by a responsible corporate official within 20 calendar days after your receipt of this letter, specifying what information will be provided within the time specified, describing what efforts have been/are being made to obtain other responsive information and providing a detailed schedule of when such other responsive information can be provided. Upon receipt and based upon such declaration, EPA may extend the time in which responsive information must be provided.

Your response to this requested information must be certified by a duly authorized officer or agent of Xcel by signing the enclosed Statement of Certification (see Enclosure 1) and returning it with your response. All information submitted in response to this request must be certified as true, correct, accurate, and complete by an individual with sufficient knowledge and authority to make such representations on behalf of Xcel.

A knowing submittal of false information in response to this request may be actionable under Section 113(c)(2) of the CAA, as well as 18 U.S.C. §§ 1001 and 1341. Xcel should also be aware that a failure to comply fully with the terms of this request may subject it to an enforcement action under Section 113 of the CAA, 42 U.S.C. § 7413.

This letter in no way affects the obligations of Xcel to comply with other Federal laws and regulations. In addition, nothing in this letter shall be construed to be a waiver by EPA of any rights or remedies under the Clean Air Act.

Xcel may assert a claim of business confidentiality regarding any portion of the information submitted in response to this request (except for emission data). (See 40 CFR 2.201 *et seq.*) Failure to assert such a claim will render all submitted information available to the public without further notice. If you believe the disclosure of specific information would reveal a trade secret, clearly identify such information.

If you have any questions, the most knowledgeable people to contact are Joshua Rickard at 303-312-6460 for technical concerns, or David Rochlin at 303-312-6892 for legal concerns on this matter.

Sincerely,

Carol Rushin
Assistant Regional Administrator,
Office of Enforcement, Compliance, &
Environmental Justice

Enclosure: Statement of Certification

cc: Wayne H. Brunetti
Chief Executive Officer
Xcel Energy, Inc.
800 Nicollet Mall
Minneapolis, MN 55402

Ken Fellman, Mayor
City of Arvada
P.O. Box 8101
8101 Ralston Road
Arvada, CO 80001-8101

Craig Kocian, City Manager
City of Arvada
P.O. Box 8101
8101 Ralston Road
Arvada, CO 80001-8101

Brian J. Macke, COGCC
1120 Lincoln
Denver, CO 80203

Margie Perkins, CDPHE
Air Quality Division
4300 Cherry Creek Dr S
Denver, CO 80246

STATEMENT OF CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

_____
(Signature)

_____
(Title)

_____
(Date)

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CORPORATION SERVICE COMPANY
1560 BROADWAY
DENVER, CO 80202

PS Form 3800, June 2002 — See Reverse for Instructions

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STATEMENT OF CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

_____
(Signature)

_____
(Title)

_____
(Date)

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(b) (5)

Enclosures: Statement of Certification

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May 25, 2005

Roland Hea, P.E.
Colorado Department of Public Health and Environment
Air Pollution Control Division
APCD-SSP-B1
4300 Cherry Creek Drive South
Denver, CO. 80222-1530

Re: Natural Gas Venting Associated with Leyden Gas Storage Facility

Dear Mr. Hea:

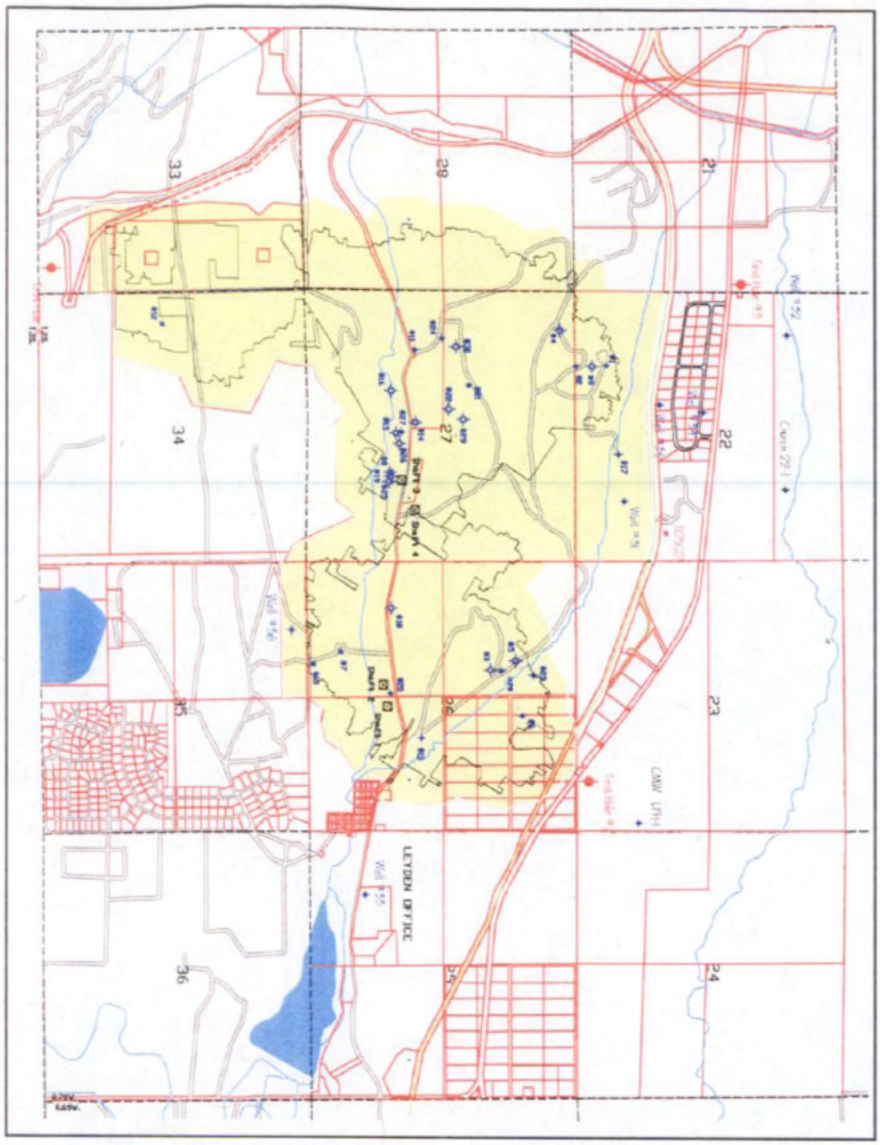
This letter is in regard to your telephone inquires on May 11, 2005 concerning the venting of natural gas during the closure of the Leyden Gas Storage Facility. Since we talked, I have learned further details about the venting timeframe and amounts.

The Leyden Gas Storage Facility has always stored pipeline quality natural gas for use in supplying the distribution system during periods of peak use. Public Service Company of Colorado (PSCo) stopped using the facility for gas storage and has filled the mine caverns with water. By the end of this year, PSCO will turn the site over to the City of Arvada to use as a water storage facility. Attached is a map showing the Leyden Facility. PSCo has been working to remove as much residual natural gas as possible from the mine under the direction of the Colorado Oil and Gas Conservation Commission (COGCC). Through May 2004, PSCo was using the engines at Leyden to withdraw the gas. After May 2004, there were no longer sufficient volumes of gas being produced to run the engines, so the gas was sent to the permitted flare at the site.

There were numerous wells on the storage site that had been used for withdrawal, but as the water rose the structurally low wells became inundated with water and stopped producing gas. In October 2004, the last well producing gas to the flare was unable to produce enough gas to keep the flare lit, so PSCo was forced to vent the gas. It was never PSCo's intention to vent large qualities of natural gas and all venting was conducted with the safety of the public in mind. Venting was the preferred alternative based on discussions with the COGCC. The following table summarizes the vented volumes for each year. The venting that occurred before October 2004 was from isolated wells that had no pipeline connection to the gathering system, was also performed within the purview of the COGCC.

Leyden Storage Field Venting		
Year	**Well(s)**	**Volumes (cubic feet)**
1999	31	9,200
2000	31	37,400
2001	31	15,700
2002	31	7,600
2003	31	8,800
2004	5, 31, 36	282,900
2005	5, 36	37,000

A gas sample taken August 2, 2004 found that the VOC content was 3.611 mass % VOC and the benzene concentration was assumed to be 0.0039 mass %. The estimated emissions for 2004, which is the year with the highest volume, produced 517 pounds of VOCs and 1 pound of benzene.



LEYDEN GAS STORAGE
FACILITY
JEFFERSON CO., COLORADO

The other situation we discussed is the Consolidated Mutual Water well, where the well encountered a natural gas deposit containing an unknown quantity of storage gas from the Leyden Facility. PSCo is still in the process of testing the well to determine its potential yield. PSCo believes that the process of producing this well falls under the Regulation 3 exemption for oil and gas exploration as follows:

II.D.1.lll. Oil and gas exploration and production operations (well site and associated equipment) shall provide written notice to the Colorado Oil and Gas Conservation Commission of proposed drilling locations prior to commencement of such operations. Air Pollutant Emission Notices are not required until after exploration and/or production drilling, workovers, completions, and testing are finished.

During the initial testing of the well, PSCo vented 1,628,000 cubic feet of natural gas. This venting occurred during October 2004 and ceased when it appeared that there was recoverable gas. An average of two gas samples, one taken in April 2004 and the other taken in October 2004, found that the VOC content was 4.602 mass % and the benzene concentration was assumed to be 0.0039 mass %. The estimated emissions for the October 2004 venting produced 3791 pounds of VOCs and 3 pounds of benzene.

Although PSCo submitted an APEN on January 6, 2005 for an engine to be used to recover the gas, further testing still needs to be conducted. To perform this testing, it will be necessary to release gas for three to five days. PSCo's preferred method is to flare the gas during the test. Based on our discussion, the flaring should fall under the APEN/Permit exemption for petroleum industry flares as follows. Please confirm your agreement with this assumption.

II.D.1.m. Petroleum industry flares, not associated with refineries, combusting natural gas containing no hydrogen sulfide except in trace (less than five hundred parts per million weight) amounts, approved by the Colorado Oil and Gas Conservation Commission and having uncontrolled emissions of any pollutant of less than five tons per year.

If you have any questions, please contact me at 720-497-2114.

Sincerely,

Robert E. King
Environmental Coordinator

Enclosures.

cc: Bill Uding
Eldon Lindt
Brian Macke, Director, COGCC
Hans Buenning, EPA
ES File

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STATE OF COLORADO

Office of the Attorney General
1525 Sherman Street, 5th Floor
Denver, Colorado 80203
Phone: (303) 866-5041
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E-mail: carol.harmon@state.co.us

Carol J. Harmon
Assistant Attorney General
Natural Resources and Environment Section

STATE OF COLORADO

Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801
Denver, CO 80203
Phone: (303) 894-2100 ext.115
Fax: (303) 894-2109
E-Mail: tricia.beaver@state.co.us
Website: www.oil-gas.state.co.us

Patricia C. Beaver, C.P.G.
Hearings Manager

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

ROCKY FLATS

-Well # 31

-CMWC Well

-Gas Migration

Leyden Facility

-Buffer Zone

-Inferred Fractures

Shaft # 3

-Shaft # 4 (Air shaft)

-Shaft # 1

Shaft # 2

-Underground Cavern Extent

-Well # 36

-Facility Boundary

Buffer Zone

ARVADA

39°54'00" N

39°53'00" N

39°52'00" N

39°51'00" N

39°50'00" N

39°49'00" N

105°15'00" W

105°14'00" W

105°13'00" W

105°12'00" W

105°11'00" W

105°10'00" W

NAD83 Horiz. Datum (Equiv. to WGS84)

NATIONAL GEOGRAPHIC MAPS

USGS science for a changing world

TN MN 10°

Magnetic Declination On 03/28/05

Scale 1 : 30,750

Contour Interval Varies: 40 ft, 10 ft

0 .5 MILES

1000 0 1000 2000 3000 4000 5000 FEET

1 .5 0 KILOMETERS 1

1000 0 1000 METERS

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MAP LOCATION IN COLORADO

1	2	3
4	5	6
7	8	9

ADJOINING 7.5' QUADS

1. Eldorado S..., CO '90
2. Louisville, CO '90
3. Lafayette, CO '90
4. Ralston Bu..., CO '90
5. Golden, CO '90
6. Arvada, CO '90
7. Evergreen, CO '94
8. Morrison, CO '94
9. Fort Logan, CO '94

Leyden Facility
Jefferson County, CO

DO NOT RELEASE

RCRA Program Draft, March 2005

All added features are approximate

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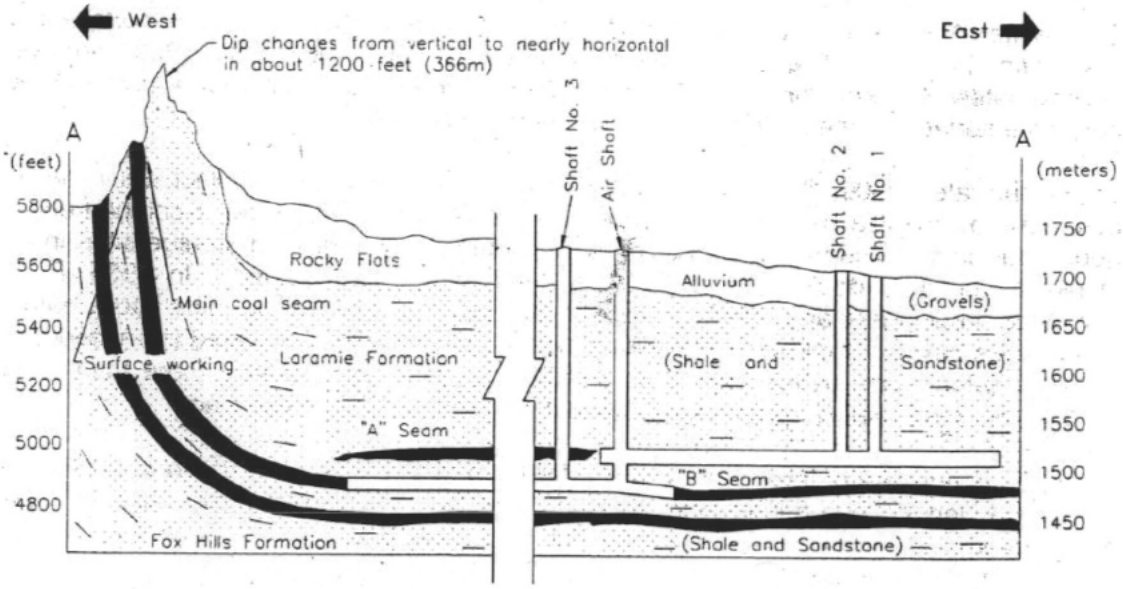
Gas Storage at the Abandoned Leyden Coal Mine near Denver, Colorado

November 25, 1998

Figure 1. Simplified East-West Cross Section of the Leyden Mine
(Modified from PSCo Brochure)



ACKNOWLEDGMENTS

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BEFORE THE OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF COLORADO

* * *

IN THE MATTER OF THE APPLICATION OF PUBLIC SERVICE COMPANY OF COLORADO FOR AN ORDER AUTHORIZING THE CLOSURE OF THE LEYDEN UNDERGROUND NATURAL GAS STORAGE FACILITY IN JEFFERSON COUNTY, COLORADO	))))))	**CAUSE NO. 146** **DOCKET NO. _____**

APPLICATION

The Applicant, Public Service Company of Colorado ("Public Service"), respectfully petitions the Oil and Gas Conservation Commission of the State of Colorado for an order authorizing the closure of the Leyden Underground Natural Gas Storage Facility operated by Public Service in Jefferson County, Colorado. In support of its application, Public Service states as follows:

1. Public Service is a Colorado corporation and is an operating public utility, as defined in C.R.S. § 40-1-103, engaged, inter alia, in the purchase, distribution, sale and transportation of natural gas in various areas in the State of Colorado. Public Service provides natural gas service to over 1.1 million residential, commercial, and industrial customers in Colorado. Public Service is a wholly-owned subsidiary of Xcel Energy Inc., which is a registered public utility holding company under the federal Public Utility Holding Company Act.

2. The address of Public Service is 1225 17th Street, Suite 900, Denver, Colorado 80202-5533. The names, addresses and telephone numbers of Public Service's representatives upon whom all notices, pleadings, correspondence, and other documents regarding this Application should be served are as follows:

William C. Uding, P.E.
Gas Storage Projects Director
Xcel Energy Services Inc.
555 15th Street, Suite 700
Denver, Colorado 80202-5533
Telephone: (303) 571-7383

and

James D. Albright, Esq.
Assistant General Counsel
Xcel Energy Services Inc.
1225 17th Street, Suite 900
Denver, Colorado 80202-5533
Telephone: (303) 294-2753

3. By Order No. 146-1 issued September 30, 1960, the Commission approved Public Service's application to establish a project for storage of natural gas in an underground reservoir situated in all or parts of Sections 21-22, 26-28, and 33-35 of Township 2 South, Range 70 West, Jefferson County, Colorado. The project was established in the caverns of an abandoned coal mine known as the Leyden Coal Mine and became known as the Leyden Underground Natural Gas Storage Facility (the "Leyden Facility"). Public Service has operated the Leyden Facility since 1960, injecting and withdrawing natural gas to support its natural gas distribution and delivery operations in the Front Range area of Colorado.

4. In the Spring of 2000, Public Service announced its decision to close the Leyden Facility due to the increasing incompatibility of its continued gas storage operations with the encroaching residential and commercial development of the surrounding area. Public Service obtained authority from the Colorado Public Utilities Commission to abandon the Leyden Facility in January, 2001. Injection of gas into storage ended on September 30, 2001, and Public Service has been withdrawing gas from the Leyden Facility since that time.

5. The Commission is vested with authority to regulate the public health, safety and welfare aspects, including protection of the environment, of the termination of operations and permanent closure of the Leyden Facility pursuant to Colorado Revised Statutes § 34-60-106(17) adopted in 2001 (the "Closure Statute"). Prior to closure of the Leyden Facility, Public Service is required to obtain a certificate of closure from the Commission. To obtain a certificate of closure, Public Service must demonstrate that its closure plan reasonably protects public health, safety and welfare, including protection of the environment.

6. Public Service has prepared and submits as Exhibit A to this Application its Closure Plan for the Leyden Facility. The Closure Plan provides for the closure of the Leyden Facility as a gas storage facility following the withdrawal of recoverable storage gas from the caverns and the abandonment of certain wells and equipment. As stated above, Public Service has been withdrawing gas from the Leyden Facility since the last injection occurred in 2001. Upon issuance of a certificate of closure by the Commission, Public Service will begin to inject potable water through existing wells to flood the underground cavern, displacing storage gas and facilitating the withdrawal process.

7. The water injected by Public Service will be supplied by the City of Arvada ("Arvada") under an agreement entered into with Public Service dated January 27, 2003. (A copy of the agreement is attached as Appendix F to the Closure Plan.) The agreement contemplates injections beginning in 2003 and continuing through 2004-05, but delivery of volumes in excess of minimum amounts is subject to availability of water and competing demands for Arvada and its customers. Upon completion of water injection operations, the Leyden Facility will be converted from natural gas storage to municipal water storage operations by Arvada. All wells and related facilities that are useful to Arvada's water storage operations will be conveyed by Public Service to Arvada. All other wells and equipment will be plugged and abandoned or reclaimed by Public

Service prior to the conversion.

8. The Closure Plan meets or exceeds the requirements of the Closure Statute in protecting the public health, safety and welfare, including the environment, relating to the closure of the Leyden Facility. Section III of the Closure Plan provides for the recovery of residual natural gas reasonably recoverable from the underground caverns. Section IV of the Closure Plan provides for the transfer of certain wells and well sites to Arvada for its use in ongoing water storage operations, while Section V provides for the abandonment of all other wells and reclamation of all other well sites in compliance with the Commission's rules and regulations. Section VI of the Closure Plan provides for the abandonment of the mine shafts that were originally sealed during the early 1960's as part of the process to convert the abandoned coal mine to a gas storage facility. Sections VII and VIII provide for the abandonment of wells used as observation wells during gas storage operations, and the abandonment of gas gathering pipelines and related above-ground facilities. Finally, Sections IX and X of the Closure Plan provide for monitoring during and after closure of the Leyden Facility, including corrective actions if such monitoring indicates that the initial measures are insufficient.

9. Public Service submits as Exhibit B to this Application a Guarantee of Performance of its obligations relating to the closure of the Leyden Facility. This Guarantee of Performance is tendered in accordance with C.R.S. § 34-60-106(13) to provide assurance that Public Service is financially capable of fulfilling its obligations imposed under the Closure Statute. The Guarantee of Performance includes the most recent balance sheets and other financial statements reflecting the financial condition of Public Service. The financial condition reflected in the Guarantee of Performance is more than sufficient to support Public Service's obligations under the Closure Plan and any conditions the Commission may reasonably impose in connection with the closure.

10. In addition to its Guarantee of Performance described in the preceding paragraph, Public Service has previously provided the Commission with a blanket plugging bond -- Bond No. 929222792, approved by the Commission on October 26, 2001 -- which covers the plugging and abandonment of wells to be plugged pursuant to the Closure Plan. All other wells at the Leyden Facility will be conveyed to Arvada pursuant to Public Service's Agreement with Arvada and will be converted to use as water injection and withdrawal wells. Following completion of closure operations and conveyance of these wells to Arvada, the wells should be removed from continuing coverage under Public Service's plugging bond. Public Service has also provided a blanket bond -- Bond No. 400SF4078, approved by the Commission on July 31, 2001 -- to assure Public Service's performance of obligations with respect to the Leyden Facility and other gas facilities operated by Public Service in Colorado. These bonds remain available to the Commission to insure Public Service's performance of these aspects of the Closure Plan.

11. Attached as Exhibit C to this Application is a list of owners and other parties to whom Public Service intends to provide notice of this Application. Public Service states to the best of its information and belief that the parties listed on Exhibit C represent all of the parties entitled to notice of this Application under the Closure Statute and Rule 503 of the Commission's regulations.

12. Attached as Exhibit D to this Application is the form of notice which Public Service has been served on all the persons identified on the above-referenced list. In addition, Public Service is causing such notice to be published in the legal classified section of The Denver Post for three consecutive days following the filing of this Application.

WHEREFORE, Public Service respectfully requests that this matter be set for hearing by the

Commission; that notice thereof be given as required by law; and that upon such hearing the Commission issue an order granting this Application and issuing a certificate of closure for the Leyden Facility as requested herein. Public Service further requests that the Commission in its order grant such other provisions as the Commission may find to be necessary or desirable in the matter.

Dated this 3rd day of March, 2003.

Respectfully submitted,

By:_____

James D. Albright, #18685
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Xcel Energy Services Inc.
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Tel.: (303) 294-2753
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and

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Fax: (303) 376-5001

ATTORNEYS FOR PUBLIC SERVICE COMPANY OF COLORADO

Verification

STATE OF COLORADO)
) ss.
CITY AND COUNTY OF DENVER)

William C. Uding, of lawful age, being first duly sworn upon oath, deposes and says that he is Gas Storage Projects Director for Xcel Energy Services Inc., agent for Public Service Company of Colorado, that he has read the foregoing Application, including the Closure Plan attached as Exhibit A thereto, and that the matters therein contained are true to the best of his knowledge, information and belief.

_____
William C. Uding

Subscribed and sworn to before me this 3rd day of March, 2003.

Witness my hand and official seal.

My commission expires: _____.

_____
Notary Public

(S E A L)

CLOSURE PLAN

FOR THE

LEYDEN UNDERGROUND

NATURAL GAS STORAGE FACILITY

Submitted by

Public Service Company of Colorado

To The

Colorado Oil and Gas Conservation Commission

March 3, 2003

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LEYDEN UNDERGROUND
NATURAL GAS STORAGE FACILITY
Submitted by
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To The
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I. Overview and Summary of Closure Plan

The Leyden Coal Mine operated for approximately 47 years from 1903 to 1950. At the time of its conversion to natural gas storage operations in 1960, the Leyden Facility was located distant from any community with the exception of the tiny town of Leyden, which remains today. The mine itself consisted of two horizontal coal seams, eight to ten feet thick, 700 to 1,100 feet below the surface. The actual area of the cavern is approximately 1,300 acres, and the difference between this area and the leased area provides the Company with an approximate 500-foot buffer zone. In 1990, Public Service renewed the initial leases for the facility for an additional 50 years. Appendix A attached to this Closure Plan is a map of the Leyden Facility showing the perimeter of the mine and the extent of the Company's leases.

IV. Conversion of Certain Gas and Water Wells to Water Storage Operation

Well #4, West Cavern
Well #5, East Cavern
Well #7, East Cavern

An east cavern well, Well #7, was drilled and operated as a water production well. It historically had been a marginal producer, having a poor connection to the cavern area. This well was recently worked over to improve its capacity as a water injection well. A 7-inch liner was installed in the well down through a previously open hole section below the cemented casing. A 1.66-inch tubing string and down hole pressure gauge were also set during that workover. Its use as a water injector will be evaluated at the time water is available for injection. This well would then be transferred to the City for use in its water storage operations.

Well #8, West Cavern

Well #8 is currently a gas withdrawal well on the south end of the west cavern. This well will be used to recover gas that is displaced as water floods the caverns. A 8⅝-inch liner is set through the cavern level in this well. At the time water reaches the 13⅜-inch casing shoe of this well, 5011 feet above sea level elevation, gas recovery will be completed. A temporary plug will be set in the bottom of the 8⅝-inch liner in order to fill the casing to surface with water. The well will be logged to verify good cement bond and a gas detection log will be run. If gas is found, the area will be perforated for possible additional gas recovery or venting. Following that, the perforations would be cement squeezed, the temporary plug would be removed and the well transferred to the City for use in its water storage operations.

Well #9, West Cavern

Well #9 is currently a gas withdrawal well on the north end of the west cavern. It is structurally the highest well in the facility. This well will be used to recover gas that is displaced as water floods the caverns. At the time water reaches the 7-inch casing shoe of this well, 5149 feet above sea level elevation, gas recovery will be completed. A temporary plug will be set in the bottom of the 7-inch casing in order to fill the casing to surface with water. The well will be logged to verify good cement bond and a gas detection log will be run. If gas is found, the area will be perforated for possible

additional gas recovery or venting. Following that, the perforations would be cement squeezed, the temporary plug would be removed and the well transferred to the City for use in its water storage operations.
Well #12, West Cavern
Well #21, West Cavern
Well #30 is a gas withdrawal well in the west cavern. This well will be used to recover gas that is displaced as water floods the caverns. At the time water reaches the 9⅝-inch casing shoe of this well, 5072 feet above sea level elevation, gas recovery will be completed. A temporary plug will be set in the bottom of the 9⅝-inch casing in order to fill the casing to surface with water. The well will be logged to verify good cement bond and a gas detection log will be run. If gas is found, the area will be perforated for possible additional gas recovery or venting. Following that, the perforations would be cement squeezed, the temporary plug would be removed and the well transferred to the City for use in its water storage operations.

V. Abandonment of Gas Injection/Withdrawal Wells

VI. Abandonment of Shaft Seal Systems

VII. Abandonment of Observation Wells

Well #1
Well #2
Wells #10 & #11
Well #13
Well #17a and #17b
Well #20
Well #23
Well #24
Well #27
Well #28
Well #31
Well #32
Well #34
This well was permitted through the State Engineers office as a water well. It was drilled and completed in 1997. Public Service plans to offer this well to the landowner who holds the water rights. If the land owner does not want the well it will be plugged and abandoned according to the Sate Engineers rules and the lease agreement.
Well #35

VIII. Abandonment of Gathering Pipelines and Removal of Above Ground Facilities

Surface Inspection
Soil Gas Testing
Observation Well Monitoring

I. Overview and Summary of Closure Plan

13. The purpose of this document is to set forth Public Service Company of Colorado's ("Public Service" or the "Company") Closure Plan for the Leyden Underground Natural Gas Storage Facility (the "Leyden Facility"). This Closure Plan focuses in detail on the steps that Public Service proposes to take in order to fully and permanently close the Leyden Facility as a natural gas storage facility in a manner that is orderly, efficient, and consistent with the public health, safety and welfare. The closure process will involve: (1) flooding the underground storage caverns with water to displace and remove the remaining recoverable storage gas; (2) plugging and abandoning certain gas injection/withdrawal wells that will no longer be required; (3) converting other gas injection/withdrawal wells for use in water storage operations and transferring those wells and the remaining water wells to the City of Arvada for its use in planned municipal water storage operations; (4) abandoning existing gas gathering lines and

other above-ground facilities; (5) surface restoration as required by lease agreements, Commission regulations and other environmental regulations; (6) post-closure monitoring; and, finally, (7) cessation of post-closure monitoring and plugging and abandoning of monitoring wells.
14.
15. Although dependent largely on the availability of sufficient quantities of water for flooding the underground storage caverns, Public Service estimates that the closure process will take approximately two and one-half years from the date of commencement of water flooding, which currently is planned to occur in mid-2003. Therefore, by the end of calendar year 2005, it is anticipated that the facility will be closed as a natural gas storage facility and the only remaining activities conducted by Public Service at the site will be post-closure monitoring and the subsequent abandonment of monitoring wells.
16.
17. In order to put into context the details of the Company's proposed Closure Plan, the following section provides a background and description of the Leyden Facility. The remaining sections of this Closure Plan discuss in greater detail the closure procedures summarized above.

II. Background and Description of the Leyden Facility

A. Background

The underground storage of natural gas is common, with over 400 underground gas storage facilities operating in the United States, nine of which are in Colorado. Most of these facilities are in depleted gas or oil fields and some in salt mines or salt cavities. The Leyden Facility, however, has the distinction of being the only converted abandoned coal mine in the United States used for natural gas storage and one of only two in the world. The Leyden Facility was featured in a paper released by the United States Environmental Protection Agency in 1998 as a potential solution for the production-area storage of coal bed methane gas.[1]

The Leyden Facility was initially developed in 1958-1959 and was placed into operation by Public Service in 1960. Since 1960, Public Service has operated the abandoned coal workings of the Leyden mine as an underground gas storage facility. The Leyden project was pursued by Public Service because of its close proximity to Denver, the Company's historic natural gas load center, the optimum injection and withdrawal capabilities of the abandoned mine caverns, and the reasonable costs to convert the Leyden Coal Mine into a natural gas storage reservoir.

In 1960, upon Public Service's application in Cause No. 146, the Colorado Oil and Gas Conservation Commission ("Commission") approved the Leyden Facility pursuant to its authority under C.R.S. § 34-64-104. In accordance with the approved project, Public Service was authorized to store natural gas in the Lower Laramie formation, where the abandoned coal caverns were located. In approving this request, the Commission found that there was substantial evidence that this natural gas storage project was in the public interest and welfare, that the storage reservoir was suitable and practicable, and that the formation or formations sought to be condemned were nonproductive of oil or gas in commercial quantities under either primary or secondary recovery methods.
18.

B. The Leyden Facility – Geography, Geology and Operations

The Leyden Facility consists of an underground gas storage field and the Leyden compressor station. The underground gas storage field includes land and land rights, both owned and leased, wells, gathering lines, surface treating systems, shaft sealing systems, and a water treating and gathering

system. The Leyden Facility covers approximately 2,000 acres or 3.1 square miles. It is located northwest of Arvada, Colorado, adjacent to Colorado Highways 93 and 72 and straddling West 82nd Avenue (Leyden Mine Road), about 14 miles from downtown Denver. The property that makes up the Leyden Facility includes parts of sections 21, 22, 26, 27, 28, 33, 34 and 35-T2S-R70W, Jefferson County, Colorado. Public Service owns two small tracts of the storage field area, 4.4 acres in section 27, where the water treatment system is located, and 30 acres of the buffer area in section 35.

The Leyden Coal Mine operated for approximately 47 years from 1903 to 1950. At the time of its conversion to natural gas storage operations in 1960, the Leyden Facility was located distant from any community with the exception of the tiny town of Leyden, which remains today. The mine itself consisted of two horizontal coal seams, eight to ten feet thick, 700 to 1,100 feet below the surface. The actual area of the cavern is approximately 1,300 acres, and the difference between this area and the leased area provides the Company with an approximate 500-foot buffer zone. In 1990, Public Service renewed the initial leases for the facility for an additional 50 years. Appendix A attached to this Closure Plan is a map of the Leyden Facility showing the perimeter of the mine and the extent of the Company's leases.

19. Referring to Appendix A, the green shaded area of the map shows the extent of the natural gas storage leases, which includes some minor ownership of land purchased by the Company. The rough black line just inside the green shading is the extent of the known coal mining activity underground. About 6 million tons of coal were removed from the mine during its production, or less than 50 percent of the coal located in the mine, leaving a void of about 150 million cubic feet. The lease property extends about 500 feet from the perimeter of the mine cavern in most areas, except for portion on the north side.

There are 14 gas injection/withdrawal wells and 20 observation and water wells on the Leyden property. These wells were drilled under permits from the Commission and the State Engineer's Office. Gas injection and withdrawal wells are shown as small hollow centered blue dots inside the green boundary on Appendix A. All gas injected or withdrawn from the storage facility moves through these wells. The solid blue dot with the cross strokes are the observation wells. Note that there are observation wells both on and off of the green-shaded leased property. The observation wells directly over the mined area, which is inside the rough black line, are used to observe the various formations above the cavern level, and those outside of the mined area are used to monitor zones both above and below the un-mined coal seams in these areas.

The shafts that were constructed and used during the coal mining era to remove the coal are shown on the map in Appendix A as bold black squares with x's in their center. These shafts were sealed in the early 1960's as a critical element of the storage seal, and have been remained sealed to the present day. A photograph of a typical shaft seal site is contained in Appendix B to the Closure Plan.

20. The gas gathering system is comprised of steel and plastic piping that is largely buried on the leased property and in public rights of way. These lines vary in size from 24-inch to 4-inch diameter.

21. The Leyden Station is located on a 6.7-acre tract of Company-owned property in Section 25, just east of the gas storage area on the north side of Leyden Road. The map shows this area as the "Leyden Office". The Leyden Station is comprised of gas compression, dehydration, and metering equipment with offices, shops, warehouses and control facilities. In order to accomplish the necessary gas injection and withdrawal process, approximately 17,000 horsepower in compression are installed in ten units at the Leyden Station. Appendix C to the Closure Plan contains a photograph of the Leyden Station showing the location of the various buildings, filter separation and dehydration facilities. The elevated spherical aluminum storage tank in the center of the photograph provides pressurized water for the entire

needs of the facility. It is planned that this station will be reconfigured for continued gas utility operations in conjunction with Public Service's high pressure pipeline facilities in the area and is not a part of the Closure Plan.

22. The Leyden Facility operates by injecting natural gas into the underground space left after coal mining. These cavern spaces have almost entirely collapsed, leaving an underground "rubble pile" of rock that supports the overlying rock formations. Due to the gradual nature of the collapse, there is no danger from subsidence at the surface over this facility. The void created by the original coal removal process is still present in the rubble although not anywhere as spacious as the "rooms" in the coal mine. Additionally, some of the sandstones within the Lower Laramie are porous and permeable enough to provide some storage capacity. A west-to-east cross section of the geologic formations is shown in Appendix D to the Closure Plan.

In 1958, before Public Service began gas storage activities, the rubble pile voids and the sandstone pores were full of water. These void spaces, where water can effectively be drained by gravity to a sump area or removed by pumping, are the primary areas within the storage reservoir where Public Service historically has stored natural gas. Gas is also stored in sandstone pockets, or lenses, located above and on either side of the mine cavern. Sandstone is porous and permeable and capable of holding natural gas. The geologic formation of the storage facility where all this occurs is the Cretaceous Lower Laramie formation. This overlies the Fox Hills sandstone and the Pierre Shale. The Lower Laramie as found in the vicinity of Leyden is approximately 250 feet thick and is predominately shales, sandstones, and coals. Coal found toward the base of the Lower Laramie was mined from two seams: the A, or upper, seam is what is now the east cavern, and the B, or lower, seam is what is now the west cavern. The coal lies at a depth of roughly 700 to 1100 feet below the ground level. Above the Lower Laramie is the Upper Laramie comprised mostly of clays, claystones and siltstones that extend nearly to the surface. These rock types are very impermeable and are responsible for the Laramie-Foxhills aquifer being classified as non-tributary. This same impermeable characteristic is what forms a very effective cap rock that prevents the vertical movement of gas to the surface.

The cap rock is a 400-foot thick layer composite of impervious clays, claystones, and siltstones separating the storage reservoir from the surface. From core samples recovered during early well drilling, Public Service determined that the Upper Laramie formation is uniformly thick, and consistently made up of these non-porous, impermeable materials. The Company also learned from observation wells, that the water levels in this formation do not materially change from year to year and, in addition, the water levels do not vary with pressure fluctuations.

23. The sandstones of the Lower Laramie were full of water prior to the mining and gas storage activities. Some of these sandstones continue to drain water into the storage area where it then runs by gravity down to the low end of the field by Well No. 12. Additionally, the Fox Hills Sandstone, which is below the mined coal level, is at a higher pressure than the pressure of the storage reservoir. Through a limited underground connection between the Fox Hills Sandstone and the storage reservoir, water flows to the path of least resistance into the storage reservoir and then down to the low end of the cavern. Public Service routinely pumps this water out in order to maintain the void space available for gas storage, and to insure that the standing water in the bottom of the "cavern" area does not submerge the openings at the bottom of the gas withdrawal wells.

Public Service has a wastewater discharge permit (Permit No. CO-0001279) issued by the Colorado Water Quality Control Division for wastewater discharges from the Leyden Facility into Leyden Creek. The permitted outfalls are: the discharge from Water Well No. 12; overflow from the livestock-watering pond that receives water from Well No. 21; discharge from the Leyden Knockout Tank; and discharge from the Retention Pond, including discharges into livestock watering pond.

C. The Decision to Close the Leyden Facility

On April 14, 2000, after 40 years of reliable operation, Public Service filed an application with the Colorado Public Utilities Commission -- the agency delegated with the authority to regulate Public Service's services, rates and facilities -- for authorization to permanently remove the Leyden Facility from public utility service. Public Service's decision to abandon the Leyden Facility was based on the conclusion that an underground gas storage field of this nature is no longer compatible with the land uses and development in the surrounding area and that, as a result, the ultimate cost to Public Service and its customers to continue operating the facility would exceed the costs necessary to replace it. Over the course of the last ten years, residential, commercial and industrial development adjacent to Leyden has grown in a way never contemplated when the Leyden Facility was conceived. When the Leyden Facility was placed into storage service in 1960, it was remotely located outside of the urban metropolis, surrounded by miles of rolling fields and a small, leftover coal mining town. Today the limits of the City of Arvada are rapidly approaching the boundaries of the Leyden Facility.

In recent years, the Leyden Facility has come under intense public scrutiny due to a series of events concerning natural gas migration. These events include a 1998 jury verdict in a Jefferson County District Court civil action brought against Public Service, which found that Leyden storage gas had migrated on to an adjacent landowner's property, and the release of information concerning a new observation well, Well No. 36, which discovered storage gas about 175 feet from the mine cavern, but within Company-owned property. The reaction in the press and by governmental officials, local landowners, developers and environmental groups to this information caused Public Service to re-evaluate the continued viability of Leyden as a gas storage site. The Company concluded that a major natural gas storage operation such as Leyden, with its associated technical complexities and uncertainties, is inconsistent with the rapidly growing residential and commercial development being experienced in the area. The Colorado Public Utilities Commission authorized the abandonment of the Leyden Facility from public utility service by orders issued December 29, 2000 and February 23, 2001. Copies of the Public Utilities Commission's orders are attached hereto as Appendix E.

24.

25. **D. Gas Migration and Leakage of Storage Gas From the Leyden Facility**

26.

27. Public Service believes that to the extent any gas migration has ever occurred from the Leyden Facility, such migration could only have occurred through sandstone lenses in communication with the mine caverns. While any such migration is virtually impossible to quantify with any degree of accuracy, at the end of the closure procedures proposed herein any such migrated gas will be at native pressures and pose no threat to safety or the environment greater than the coal bed methane gas already present in the underlying formations in the area. In addition, Public Service firmly believes that, based on the characteristics of the Upper Laramie, the only way storage gas could ever leak to the surface in sufficient quantities to be recognized as such is through artificial penetrations, such as boreholes, through the cap rock. There have been a few isolated instances of storage gas leaking to the surface over the 40-plus year life of the facility. But it is important to note that in each case the cause was, in fact, a borehole. The leaks were found by Public Service during leakage surveys, and they were all promptly repaired.

The first of these leaks was found in the Barbara Gulch area as bubbles under ice in 1964. The source was traced back to an abandoned water well extending from below the mine level. The well's casing was removed and new casing installed. This borehole is now operated as observation Well No. 17.

28. In the mid 1970's, gas bubbling was observed inside the concrete liner of shaft seal no. 2. It was found that this gas bubbling was associated with pumping water from the east workings from water well nos. 7 and 13. In response, Public Service discontinued pumping from these wells to allow the standing water in this area of the mine to cover the bottom of shaft no. 2.

Another borehole that was found leaking to the surface was discovered during a surface leakage survey that is a part of a regular effort by the field operators. In December 1979, a surface leak of storage gas was located on the northeast edge of the field. Again, a drill rig was brought in to the location of the gas and began drilling. An unplugged core hole from the mining era was found shortly after drilling began. This hole was cleaned to bottom, around 500 feet, and casing was cemented in the hole. This is now operated as observation well no. 23.

To Public Service's knowledge, no gas from the storage facility has ever escaped to the surface except through man-made holes punched through the cap rock as explained. Otherwise, the cap rock seal has been one hundred percent effective.

Public Service employs several methods for monitoring gas leakage at the Leyden Facility. First, each well is visited and inspected not less than once per week. Second, a walking survey with gas detection equipment is performed on a regular basis over the storage field area and the buried gas gathering piping. An annual inspection of the gas storage area is also performed from a helicopter by looking for stressed or dead vegetation. Finally, permanent soil vapor extraction points have been installed around the southeast perimeter of the storage area. Samples from these monitor points are collected and analyzed in a laboratory for hydrocarbon gas content.

In 1999, Public Service drilled an observation well, Well No. 36, in which it discovered the existence of storage gas in a Lower Laramie sandstone about 775 feet below ground level outside the perimeter of the mine cavern. The most likely path of the gas found in Well No. 36 is through fractures in the Lower Laramie rock above the original mine level that created a pathway to the sandstone lens allowing gas to migrate to this point. This pathway was likely created as the roof collapsed into the now rubble pile area. Once in the sandstone the gas appears to have migrated to the area where Well No. 36 was drilled.

III. Water Flooding of the Caverns and Removal of Storage Gas

29. During the early engineering design work of the facility closure process, Public Service concluded that flooding of the abandoned mine workings with water was the most efficient and effective means to extract the remaining recoverable storage gas and retire the gas storage reservoir. Injection of water is necessary to displace the gas volumetrically in the mine cavern. Water flooding would also return the property as nearly as practical to its condition before gas storage operations commenced. Although the underlying Fox Hills aquifer would fill the underground caverns eventually through natural water flow, it was determined that this natural water flooding process would take approximately 40 years, and would require Public Service to retain gas storage rights and remain on the leased property during this period. It was therefore concluded that an external supply of water would need to be secured to facilitate the flooding operations. An estimated 2100 acre-feet of water would be required to accomplish this. Due to federal Environmental Protection Agency regulations, it was also concluded that the water supply should be potable.

30.

31. In mid-2001, Public Service and the City of Arvada (the "City")) began discussing the concept of converting the caverns to water storage for the City's use. If the project were possible, it was believed that Public Service would get an economic, reliable, and high quality source of water necessary for the abandonment of the gas storage operation, significantly reducing the cost of the abandonment process.